

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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In re Application of:

ISHIKAWA

Art Unit: 2855

Application No. 09/466,832

Examiner: L. Martir

Filed: December 20, 1999

Atty. Docket No. 107443-09012

For: MOLD CLAMPING CONTROL DEVICE CAPABLE OF ACCURATELY CONTROLLING MOLD CLAMPING FORCES EXERTED ON A MOLD DURING INJECTION MOLDING

REQUEST FOR RECONSIDERATION

Commissioner for Patents
Washington, D.C. 20231

October 15, 2001

Sir:

In reply to the Office Action mailed July 31, 2001, reconsideration of the application is respectfully requested in view of the following remarks.

Claims 1-26 are pending in this application.

Claims 1-26 stand rejected under 35 U.S.C. § 103(a) over Hiraoka (U.S. Patent No. 5,371,450, hereinafter referred to as '450) and in view of Hiraoka (U.S. Patent No. 5,912,025, hereinafter referred to as '025). Specifically, the Office Action asserts that '450 discloses all of the features of Applicant's claimed invention except for a second sensor to detect a mold clamping force. However, the Office Action asserts that '025 discloses the subject matter lacking in '450, therefore, one of ordinary skill would be motivated to combine the references to render obvious Applicant's claimed invention. In view of the following remarks, Applicant respectfully traverses this rejection.

In particular, independent claim 1 is directed to a mold clamping control device for use in an injection molding machine having a screw for injecting molten resin into a mold.

The mold clamping control device includes a first sensor, a second sensor, a target value generator and a mold clamping control unit. Claim 1 recites that the first sensor detects a relative position between a movable platen and a fixed platen to produce a detected platen position. Claim 1 also recites that the second sensor detects a molding clamp force exerted on the mold clamped by the movable platen and the fixed platen to produce a detected mold clamping force. The target value generator generates a target value between the movable platen and the fixed platen as a target platen position value and generates a target mold clamping force value. Claim 1 further recites that the mold clamping control unit calculates a position deviation and a mold clamping deviation. The position deviation is a deviation between the target platen position value and the detected platen position. The mold clamping deviation is a deviation between the target mold clamping force value and the detected mold clamping force. Claim 1 recites that the mold clamping control unit is configured to selectively control a mold clamping motor based upon either the position deviation or the mold clamping deviation.

Additionally, independent claim 14 is directed to a method for controlling mold clamping in an injection molding machine. Claim 14 recites the steps of: detecting a relative position between a movable platen and a fixed platen to produce a detected platen position; detecting a mold clamping force exerted on a mold clamped by the movable platen and the fixed platen to produce a detected mold clamping force; generating a target value between the movable platen and the fixed platen as a target platen position value for generating a target mold clamping force value; calculating a position deviation and a mold clamping deviation as discussed above; and, selectively controlling a mold clamping motor based upon one of the position deviation and the mold clamping deviation.

'450 is directed to a control unit for an injection molding machine as shown in Fig. 1. Note that '450 is directed only to the injection molding operation of the injection molding machine. By contrast, the present invention is directed to a mold clamping control device with a mold clamping mechanism for an injection molding machine as illustrated in Fig. 1 of the present application. Although further supported in detail below, the claimed invention and '450 address two distinctly different and separate aspects of an injection molding machine; therefore, a person of ordinary skill in the art would not look at the teachings of '450 to yield the present invention.

Applicant respectfully submits that, contrary to the Office Action's assertions, '450 does not disclose a first sensor to detect relative position. Specifically, column 4, lines 3-5 of '450, states that a position sensor 25 detects movement of the screw 21 to produce a position detection signal representative of a position of the screw 21. By contrast, in the mold clamping control device of the invention, claim 1 recites a first sensor for detecting relative position between a movable platen and a fixed platen to produce a detected platen position. The position sensor 25 of '450 is incapable of detecting relative position between a movable platen and a fixed platen to produce a detected platen position.

Applicant respectfully submits that, contrary to the Office Action's assertions, '450 does not include a target value generator that generates a target value between the movable platen and the fixed platen as a target platen position value and generating a target mold clamping force value. In col. 4, lines 61-64 of '450, it states that the position pattern generator 24-2 successively produces a position pattern signal S_x representative of a position of the screw in relation to time. The position pattern generator 24-2 (referred to by the Office Action as a target value generator) does not generate a target value between

a movable platen and a fixed platen as a target platen position value, nor does it generate a target mold clamping force value.

The Office Action asserts that '450 includes a mold clamping control unit 30 as per col. 6, lines 20-23 of the reference. These lines recite a controller 30, according to this embodiment, comprises a position feedback control system similar to the conventional position feedback control system illustrated in Fig. 2.

Column 3, lines 26-28 of '450 states that Fig. 2 is a block diagram for describing a structure of a conventional controller which is applied to the injection molding machine illustrated in Fig. 1. '450's Fig. 1 is a schematic block diagram of an injection unit of typical injection molding machine. Therefore, Figs. 1 and 2 fail to disclose a mold clamping control device. Accordingly, Applicant respectfully submits that the controller 30 referred to in the Office Action as a mold clamping control unit is associated with the injection operation of an injection molding machine and is not in any way associated with mold clamping or mold clamping control.

The Office Action refers to subtracting units 24-3 and 24-5 for subtracting the detected platen position and the detected mold clamping force to produce position deviation in the mold clamping deviation values. The subtracting units 24-3 and 24-5 are components of the controller 24 in '450 (col. 4, lines 47-50). As mentioned above, the controller 24 is associated with the molten resin injection operation of an injection molding machine and is not in any way associated or related to mold clamping control as is alleged in the Office Action.

The Office Action asserts that a switch 51 is used to selectively produce the position deviation and the mold clamping deviation. The switch 51 in '450 is a changeover switch

that is associated with the molten resin injection operation of the injection molding machine. Accordingly, '450 seems to fail to teach or suggest that switch 51 produces position deviation and mold clamping deviation.

The Office Action also alleges that a generating unit 24 of '450 generates control command values for the mold clamping motor 11. As discussed above, the controller 24 is associated with a molten resin injection operation of the injection molding machine and is not associated in any way with mold clamping control.

The Office Action alleges that servomotor 11 is a mold clamping motor. In col. 3, lines 55-57, '450 states that the rotation of the servomotor 11 is converted into the linear motion through the roller screw 12 and the roller nut 13 to carry out a filling operation of molten resin. The servomotor 11 is associated with the screw for injecting molten resin into a mold. The servomotor 11 is not a mold clamping motor as alleged in the Office Action.

The Office Action alleges that a first subtractor 24-3 that subtracts the detected platen position, a second subtractor 24-5 that subtracts the detected mold clamping force, a platen position compensation unit 24-4, a mold clamping force compensation unit 30-2 and a switch 51 selectively supply and produce the command and deviation values as recited in claims 3 and 4. Again, the first subtractor 24-3, the alleged platen position compensator unit 24-4 and the second subtractor 24-5 are components of the controller 24 (col. 4, lines 47-50).

To reiterate, controller 24 is associated with the molten resin injecting operation of the injection molding machine and is not in any manner associated with mold clamping control as recited in the claimed invention. The alleged mold clamping force compensation unit 30-2 is a pressure limitation compensator (col. 6, line 55). The pressure limitation

compensator 30-2 is a component of a controller 30 that includes a position feedback control system similar to the conventional position feedback control system illustrated in Fig. 2 (col. 6, lines 20-23). As stated above, Fig. 2 is a block diagram of a conventional controller which is applied to the injection molding machine illustrated in Fig. 1. Again, to reiterate, Fig. 1 is a schematic block diagram of an injection unit of a typical injection molding machine. Fig. 1 is directed to the molten resin injecting operation of the injection molding machine and is not associated with mold clamping or mold clamping control as recited in the claims.

The Office Action alleges that switch 51 is used to selectively produce the position deviation and the mold clamping deviation. Then, the Office Action improperly asserts that switch 51 is a target value switch. Further, the Office Action also states that the switch 51 is a detected value switch. However, the applied art fails to teach or suggest that switch 51 is used to selectively produce the position deviation and the mold clamping deviation or is used as a target value switch or a detected value switch.

In summary, it appears that none of the above teaches or suggests any functionality or utility whatsoever with mold clamping control and the mold clamping control device of the claimed invention.

'025 is directed to a control device for a motor-driven injection molding machine. The purpose of the control device is to generate a larger clamping force. The control device includes a mold clamping system which comprises a servo-motor and a ball screw mechanism. The ball screw mechanism includes a screw shaft and a nut for use of converting the rotation of the servo-motor into direct linear motion. The control device includes a pattern generator for generating a set pattern for the clamping force. The mold

clamping system generates a clamping force according to a set pattern and a maximum clamping force with the set pattern being determined to be larger than the clamping force that is generated by the servo-motor within predetermined ratings.

Although '025 is directed to a control device used for mold clamping, it fails to cure the above-described deficiencies of '450.

In view of the above, Applicant respectfully submits that the Examiner is applying impermissible hindsight reconstruction because the prior art does not contain or suggest the features stated in the Office Action. The claimed invention is being used as a template for the reconstruction of the invention, the elements of which are neither taught or suggested alone or in combination in the applied art.

References are not properly combinable if their intended function is destroyed

The Court of Appeals for the Federal Circuit has consistently held that when an obviousness rejection under 35 U.S.C. § 103 is based upon a modification of a reference that destroys the intent, purpose or function of the invention disclosed in the reference, such a proposed modification is not proper and a *prima facie* case of obviousness cannot be properly made. The Court in In re Gordon, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984), ruled:

If the prior art reference is cited that requires some modification in order to meet the claimed invention or requires some modification in order to be properly combined with another reference and such a modification destroys the purpose or function of the invention disclosed in the reference, one of ordinary skill in the art would not have found a reason to make the claimed modification.

The court in In re Gordon cited the lack of a technological motivation for making the modification necessary to arrive at the claimed invention as evidence that the suggestion for the proposed modification could not have come from the reference itself.

As discussed above, '450 is directed to the molten resin injecting operation of an injection molding machine. In contrast, the claimed invention is directed to a mold clamping control device and a method for controlling mold clamping in an injection molding machine. The combination of '450 and '025 destroys the function of '450, which is associated with injecting molten resin, and impermissibly changes its function to a mold clamping control device. Such destruction of the function of '450 is impermissible under substantive law.

Applied art fails to resolve a problem addressed by the claimed invention

The case of Eibel Process Co. v. Minnesota and Ontario Paper Co., 261 US 45 (1923) established a rule that a discovery of a source of a problem may result in a patentable invention despite the fact that the solution would have been obvious once the source of the problem was discovered. Thus, a patentable discovery made by an inventor might be the discovery of the problem, the source of the problem or the solution to that problem. In In re Nomiya, 509 F.2d 566, 572, 184 USPQ 607, 612 (CCPA 1975), the court stated:

[Where] there is no evidence of record that a person of ordinary skill in the art at the time of [an applicant's] invention would have expected [a problem], . . . , it is not proper to conclude that [an invention] which solves this problem . . . would have been obvious to that hypothetical person of ordinary skill in the art.

The present application on page 2, lines 26-29, states

Therefore, an object of the present invention is to provide a mold clamping control device capable of accurately controlling mold clamping forces to thereby reduce defective appearance of molded articles, especially high precision and ultra-precision articles.

In contrast, '450 is directed solely to the molten resin injecting operation of an injection molding machine. There is no teaching or suggestion that Hiraoka '450 is directed to a mold clamping control device or a method of controlling mold clamping in an injection molding machine. '025 is directed to a mold clamping system. However, the control device of '025 generates a clamping force intentionally exceeding the predetermined power rating of the servo-motor. None of the applied art, alone or in combination, is directed to accurately controlling mold clamping forces to reduce defective appearances of molded articles as the claimed invention.

For at least this additional reason, Applicant respectfully submits that this rejection is improper.

Non-analogous art cannot be used to establish obviousness

Analogous art is all art that is either in the field of technology of the claimed invention or deals with the same problem solved by the claimed invention even though outside the field of technology of the invention. The CCPA held in In re Wood, 599 F.2d 1032, 202 USPQ 171 (CCPA 1979):

To determine that a reference is from a non-analogous art is therefore two-fold. First, we decide if the reference is within the field of the inventor's endeavor. If it is not, we proceed to determine whether the reference is reasonably pertinent to the particular problem with which the inventor was involved.

The claimed invention and reference patents are within the same field of endeavor if they have essentially the same function and structure. In re Deminshi, 796 F.2d 436, 230 USPQ 313 (Fed. Cir. 1986). '450 is directed to injecting molten resin while the present invention is directed to mold clamping. The '450 structure shown in Fig. 1 has no resemblance whatsoever to the claimed structure in Fig. 1 of the application. Therefore, these inventions are not in the same field.

'450 is alleged to include substantially all of the elements of the claimed invention. However, '450 is not pertinent to the particular problem resolved by the claimed invention. '450 teaches a control unit for carrying out a switching operation between position and pressure feedback control during a molten resin injecting operation of an injection molding machine. By contrast, the claimed invention accurately controls mold clamping forces. Accordingly, Applicant respectfully submits that the art applied in the Office Action is non-analogous. In view of substantive law, Applicant respectfully submits that the rejection is improper for at least this additional reason.

Claims 2-13 depend from claim 1 and claims 15-26 depend from claim 14. Accordingly, for at least the above reasons, Applicant respectfully requests the withdrawal of the rejection of claims 1-26 under 35 U.S.C. § 103(a).

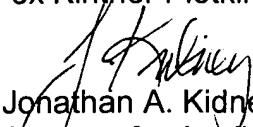
Conclusion

In view of the above remarks, Applicant respectfully submits that the application is in condition for allowance. Favorable reconsideration and prompt allowance is earnestly solicited. Should the Examiner believe anything further is desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact Applicant's undersigned attorney at the telephone number listed below.

In the event this paper is not considered to be timely filed, Applicants respectfully petition for an appropriate extension of time. The Commissioner is authorized to charge payment for any additional fees which may be required with respect to this paper to Counsel's Deposit Account 01-2300.

Respectfully submitted,

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